ARCS SMET Datalogger and Sensor Calibration (CALF)

I. Purpose:

The purpose of this procedure is to describe the steps performed by the RESET team to field calibrate the SMET dataloggers using references for the wind sensors, standard temperature, relative humidity, and a voltage standard.

II. Cautions and Hazards:

- The voltage standard runs on 110 Volt AC power.
- Only RESET team members trained in electrical safety can conduct these procedures.
- Calibration using the wind and temperature sensors requires bringing down the meteorological tower; this requires at least two people.
- Conduct these procedures at the dataloggers if there is no reasonable chance of rain.
- Because part of this procedure requires comparison to the reference T/RH probe. Do not quickly transfer the reference probe from a dry to a moist environment; allow about one hour for the probe to adjust to the moist tropical environment before making the humidity comparison; the probe is calibrated for a moist environment.

III. Requirements:

- Reference Standard Voltage Source.
- Calibrated Digital multimeter.
- Six (6) and Eight (8) Pin Break-Out Boxes.
- RS422/232 Data Conversion Box.
- Computer with Terminal Emulation Software.
- Digital Barometer with Power Adapter.
- Comparison T/RH Indicator and Probe calibrated in past year.
- Wind Angle Bracket.
- Wind Speed Drive Motor and Fixture.
- Ice Chest.
- A/C Power Cord.
- Reference Calibrated Temperature Probe and Indicator.
- Insolated Container filled with Water (Drip Water from Air Conditioner works well because it is close to ambient)
- Step-ladder to keep anemometer bracket from Hitting Ground.

IV. Procedure:

Before continuing with the rest of this procedure, a high quality ground MUST be connected to the datalogger case. If the datalogger does not have a good ground reference, a significant offset I\on the A/D measurements occurs.

While conducting this procedure, log serial numbers, standard voltages, and resistances versus measured values on Excel-formatted calibration forms (example attached).

A. Preliminary Preparation:

(See Attachment 1, A. Preliminary Preparation Work Process Flow Diagram.)

1. If work is conducted outside near the meteorological tower, lower tower, two to three people are necessary: rest tower on ladder.
2. This procedure takes several hours so set up awning for shade.
3. Before starting the following procedure, make sure that the datalogger configuration was recently uploaded to ADaM; accessing the ZENO software configuration can lead to deletion of all old data.

B. Calibrate Wind Speed and Direction (Both Logger and Sensor):

(See Attachment 2, B. Calibrate Wind Speed and Direction (Both Logger and Sensor) Work Process Flow Diagram.)

1. Remove the Wind Monitor.
2. Place the Vane Angle Fixture on the orientation ring. (Important: do not loosen or adjust lower orientation ring with notch for sensor unless initial orientation to North is incorrect).
3. Replace Wind Monitor on the Vane Angle Fixture.
4. Engage the indexing pins in the notches and tighten the clamps (also attach holding arm to the fixture).
5. Connect a notebook PC to the SMET data logger.
6. Ensure that the time on the data logger is correct; if not, set to the correct time (using the system functions menu).
7. Step through the ZENO menus (U, T, and Scaled).
8. Use the Vane Angle Fixture to position the vane at 30 degree increments (except 360^{o} where there can be a 1 to 5 degree dead Zone).
9. Begin filliong out calibration form FM(DAQM)-001.
10. Ensure that the ZENO report wind directions within ±5 degrees of the Vane Angle Fixture settings. (If the instrument fails document variance

and retest; if fails again contact mentor and follow instructions, e.g., replace sensor and try again, consider a voltage calibration of ZENO datalogger [see section C. below]).

11. If instrument does not fail, remove the Wind Monitor and Vane Angle Fixture.
12. Place the Wind Monitor on the orientation ring.
13. Engage the orientation ring indexing pin in the notch at the instrument base.
14. Tighten the mounting post band clamp after carefully and evenly attaching to ONLY the rotating part of the anemometer (align with end of rotating part).
15. Connect the Anemometer Motor Drive to the propeller shaft.
16. Turn ON the Motor Drive.
17. Set Motor for CW (clockwise).
18. Set the speed to 200 RPM (ZENO reports a 10 Hz signal in raw data mode), to 400 RPM (ZENO reports a 20 Hz signal), to 800 RPM (ZENO reports a 40 Hz signal), to 1600 RPM (ZENO reports a 80 Hz signal), and to 3200 RPM (the ZENO reports a 160 Hz signal). (Achieving a steady 200 Hz may be difficult and several efforts at realigning the motor and anemometer shaft and/or moving in or out may be necessary).

    Note: If testing Wind Monitor #1 (input connector 3), check the calibration values for Sensor #1 for conversion from Hz to meters/sec.

    Note: If testing Wind Monitor #2 (input connector 4), check the calibration values for Sensor #3 for conversion from Hz to meters/sec..
19. If the measured values in Hz differ by more than 5 Hz, realign motor and anemometer; retest; if fails, document variance and contact mentor, following instructions, e.g., replace motor and retest, continue to section C., etc.

    Note: It is important to log in the calibration record which wind record goes with the higher and lower anemometers respectively and make sure the calibration factors are not reversed for the two anemometers.
20. If sensor calibration is not completed for both sensors, Connector 3 and Connector 4, return to the beginning, step 1.
21. If the configuration did not change, continue to step 24.
22. If the configuration changed, change version number in data output menu, i.e., include current UTC date (use capital **V**).
23. Save the changes to EEPROM.
24. Download the new configuration to the notebook computer.

25. Document whether WIND1 and WIND2 correspond to the higher and lower anemometers.
26. Terminate the connection by selecting Quit.
27. Disconnect the notebook computer.
28. Connect the logger to ADaM.
29. If you have the correct ADaM configuration, download the new SMET ZENO configuration to ADaM.
30. Send a copy of the calibration report to the Calibration and Instrument mentors.
31. Continue to Section C.

C. Calibrate T/RH (Both Logger and Sensor):

(See Attachment 3, C. Calibrate T/RH (Both Logger and Sensor Work Process Flow Diagram.)

1. Connect the Temperature/Relative Humidity Probe to the SMET datalogger.
2. Remove filter and cover tip of probe with filter protector and water proof cover (such as the finger of a rubber glove) and place in water cup. (Put water in an insolated container; put the Reference Thermometer and the SMET probe into the water and close the lid.)
3. Connect a notebook PC to the SMET data logger.
4. Select the ZENO System Function Menu and change the Real- Time Output Format to ASCII (1).
5. Quit in order to view the output message.
6. Compare the ZENO temperature reading to the reference temperature and the ZENO resistance ratio to the Resistance/Temperature Table for the temperature.

   Note: It is important that there are fresh batteries in the reference temperature probe.

   Note: This is done by going to the user (U) Data Retrieval menu (D) and List last record (L1). The average temperature is the 6th field after the time (example: TWP-Nauru.smet V9801300.00 98/03/06, 17:58:59, 40800, -0.10, 0.00, -0.10, -0.10, 5.66, 0.12, . . . [The underlined 5.66 value is the average temperature]; see attached screen output.)
7. If they disagree, document the variance, retest, and if it fails, contact the mentor and follow directions, e.g.,
   a) change the multiplier in Process 4 up or down several hundredths or thousandths; the value of this constant should be about 13.000,

b) QUIT to view the output message; wait several minutes for the change to take effect; you may view the raw data from the Test Menu until non-zeros appear to be sure that the changes have taken effect, and then quit to view the output message,

c) if the temperatures do not agree within ±0.5°C, repeat steps a) and b) until they agree.

8. If they agree, remove the cup or flask from the insulated box.
9. Remove the watertight cover from the SMET probe.
10. Follow procedure PRO(TRH)-001 for T and RH comparison.
11. Ensure there is agreement within 4% between ZENO and reference RH values.
12. If it agrees, continue to step 24.
13. If it do not agree, document the variance and retest.
14. If it does not fail, continue to step 24.
15. If it fails contact the mentor.
16. Follow mentor's recommendations, e.g., calibrate the reference RH probe using RH calibration box and salts (see below) and calibrate datalogger if still disagrees; replace SMET probe with one having recent calibration, etc.
17. If the calibration is successful, continue to step 24.
18. If not adjusted, return probe to Vaisala for repair.
19. If the configuration is not changed from the data output menu, continue to step 28.
20. If the configuration is changed, change configuration version number to include the current date.
21. Change the real-time output format to None (0).
22. Save changes to EEPROM.
23. Download new configuration into notebook computer. (Format : METymmdd.cfg.)
24. QUIT to terminate connection.
25. Disconnect notebook computer.
26. Connect logger to ADaM.
27. Download the new SMET ZENO configuration to ADaM.
28. Send a copy of the calibration report to the calibration and instrument mentors.

D. Installation of the Probe into the Aspirated Radiation Shield:

(See Attachment 4, D. Installation of the Probe into the Aspirated Radiation Shield Work Process Flow Diagram.)

1. Slide the adapter ring over the probe from the sensor end, up towards the cable.
2. Screw the locking nut into the top of the aspirator, opposite the cone and rain shield.
3. Slide the probe through the locking nut.
4. Adjust the position of the adapter ring so that the sensor end is even with the end of the inner tube of the shield (cone).
5. While holding the probe to prevent it from twisting, tighten the locking nut until the probe is held firmly; there is no need to over tighten the nut.
6. Use a small cable tie to attach the cable to the probe so that the cover slides over easily; do not make a sharp bend in the cable.
7. Slide the cover over the probe so that the cable exits the cover through the notch in the cover; this notch faces the back, or motor end, of the aspirator.
8. Using some clear packing tape, tape the cover in place by wrapping the tape around the seam.
9. Using some black cable ties, secure the cable to the aspirator tube.

E. Using Voltage Reference to Calibrate the Optical Rain Gauge (Both Logger and Sensor) or the Datalogger RH and Wind Direction Channels (if Necessary):

(See Attachment 5, D. Using Voltage Reference to Calibrate the Optical Rain Gauge (Both Logger and Sensor) or the Datalogger RH and Wind Direction Channels (if Necessary) Work Process Flow Diagram.)

1. Determine the sensor type.
2. If the senor is “ORG” type, follow procedure PRO(ORG)-005.001 (Electronic Calibration of ORG) and continue to Step 18.
3. If it does not agree with the rain gauge, connect voltage standard to pins 3 (positive) and 4 (negative on 6-pin Breakout Box.
4. Remove connector 1 on the SMET datalogger.
5. Connect Breakout Box.
6. Connect Notebook PC to SMET datalogger.
7. Select ZENO from the system function menu.
8. Change to real-time output format (ASCII/1).

9. Press “Q” to QUIT and view the output message.
10. In 0 V, 25 mV, 1 V, 3 V, and 5 V.
11. If there is a difference greater than 5%, document the variance, retest; if it fails contact the mentor, follow instructions, and continue to step 12.
12. If there is no configuration change, continue to step 18.
13. If there is a configuration change, change the version number to include the current date.
14. Exit the real-time output format (none/0).
15. Save changes to EEPROM.
16. Download new configuration into notebook computer. (Format : METymmdd.cfg.)
17. Press “Q” to QUIT which terminates connection.
18. Disconnect notebook computer.
19. Continue to section F.
20. If the sensor type is RH and it agrees with comparison instruments, continue to section F below.
21. If it does not agree determine sensor type.
22. If wind direction, follow steps above using connector 3 for WIND1 and connector 4 for WIND2.
23. Ensure that the anemometers related to WIND1 and WIND2 are correct.
24. Connect reference voltage across pins 5 (positive) and 6 (negative).
25. Input voltages 0 V, 0.5 V, and 1.0 V.
26. If RH, follow steps above using the 8-Pin Breakout Box and connector 2.
27. Connect the reference voltage across pins 3 (positive) and 2 (negative) and perform step 25 and continue with step 11.

F. Check Barometer (Both Logger and Sensor):

(See Attachment 6, F. Check Barometer (Both Logger and Sensor) Work Process Flow Diagram.)

28. Connect a notebook PC to the SMET datalogger.
29. Step through the ZENO menus (U and P Poll barometer).
30. Remove red cap from reference barometer (if there is no reference barometer use the barometer for the BBSS).
31. Turn ON (runs on batteries but may need power adapter).
32. If measurements agree within ±0.5 mb continue to section G.

33. If measurements do not agree within ±0.5 mb, document the variance and retest.
34. If the agree, continue to section G.
35. If they disagree by more than 1 mb, contact mentor. (Options include doing nothing if reference is old, replacing datalogger, or replacing barometer in datalogger.)
36. Continue to section G.

G. Calibrate RH Part Of T/RH Probe Using MeteorAG chilled-mirror probes: (note: this procedure is under development)

1. Attach chilled-mirror (CM) and chilled-mirror temperature sensor (T) onto the SMET aspirator arm so that the input nozzle is close to T/RH sensor and the temperature sensor is inside the aspirator tube near the sensor (note: take the chilled-mirror unit out of the air conditioned vans at least 6 hours before installing on the tower to limit internal condensation effects on the sensor and electronics).

2. Connect the CM and T cables to white chilled-mirror control box and place control box into box attached to tower for rain protection.

3. Connect the output of the control box (Ausgang) to lemo connectors on the Tattletale data logger (each connector is color labled) and power box and put this also in the rain protection box.

4. Connect the power line from the Tattletale/power box to the chilled-mirror control box.

5. Either install 3 9 volt batteries or connect the 12 volt charger with a 110 V AC extension cord to the Tattletale/power box (use 12 volt charger if possible).

6. Make sure the chilled-mirror controller is on (EIN position). If the power an CM connections are correct the chilled-mirror fan can be heard if your ear is close to the aluminum chilled-mirror box.

7. Connect the 9 pin connector cable to the tattle-tale (if this cable is lost the cable for the Tidbit system in Nauru is the same).

8. Connect the 9 pin connector to a laptop running the Tattletale software (TxTools.exe).

9. Run TXTools on the laptop. When the switch on the Tattletale part of the Tattletale/power box is turned off and on, a response message should be displayed on the laptop computer. If there is no prompt there is either a power problem or a data link problem. Make sure the power connections

are correct and no other software program is tying up the data port. The data port should be configured at 19200 baud, 8 data bits, 1 stop bit, no handshake, and no parity.

10. Click on File and then Open. Then select mirror2.txb.

11. Press ALT key and R to run mirror2.

12. If the port is open and properly configured, the tattletale logger should respond asking for sampling interval (use 60 seconds to match the zeno logger), the date and time (the logger will ask you to press the enter key to syncronize the time. You can use your watch if it has been recently sycronized to the time on Adam).

13. Lines of data will then be displayed (actually two for each sample) with the times and voltages from the chilled-mirror and temperature sensor. The last two items in the list are the converted temperature and dew point temperatures in centigrade.

14. The laptop and 9 pin cable can now be removed from the logger. The weather protection box can now be closed and data taken over night (nighttime comparison is the best as the sun shining on the CM sensor seems to cause an offset during the day as the CM is not aspirated as well as the T/RH probe.

15. The next morning, connect the laptop and 9 pin cable to the tattletale. Open Txtools on the laptop (do not open mirror2 again). Wait for several minutes for the tattletale to communicate with the laptop this takes a very long time for some reason and if you panic and recycle the tattletale it is very hard to get the data off the tattletale. Once you begin to receive line of data, press the Cntrl key and the C key together.

16. Note the number of bytes displayed when the file closes. Press the Alt key and the O key to offload. Make sure the start address is zero. Then make the end address the number of bytes displayed after Cntrl C closed the data taking.

17. The software will suggest a file name of Offload.dat. Change the filename to CMyymmdd.dat and continue.

18. Go to the D-van and using a terminal emulator connect to the SMET data logger. Then either with screen capture of file capture, download the data from the SMET logger for the same period captured by the chilled-mirror. Name this file METyymmdd.dat

19. FTP the data to **ftp.twppo.lanl.gov** or email to **wporch@lanl.gov** . The data will be analyzed and if the humidity calibration needs to be changed, RESET will be contacted and told what to change on the logger configuration.

H. Calibrate RH Part Of T/RH Probe Using Calibration Box and Salt Solutions: (note: this procedure is no longer supported)

(See Attachment 7, G. Calibrate RH Part of T/RH Probe Using Calibration Box and Salt Solutions Work Process Flow Diagram.)

See PRO(TRH)-003 for more information.

1. Prepare three salt solutions by putting salt in jars up to lower part of dark line on jar and filling to upper line with distilled water.
2. Allow 24 hours to equilibrate.
3. Remove filters and put probe and reference into holes in jar tops (do not put probes in the liquid).
4. Wait 30 minutes and record humidities.
5. Change potentiometer settings at exactly 10 minute intervals.
6. If differences agree to within 5% of three-point humidities (RH 11.3 % for lithium chloride, 75.5% for NaCl, and 97.6% for K_2SO_4 at 20 ^oC), end.
7. If disagree, record variances and stop.
8. Contact mentor to consider recalibration or replacement.
9. If recalibrate adjust pot in probe to correct humidities with theoretical values and return to step 6.
10. If replace, repeat above with replacement probe and return to step 6.

I. Cal Check BBSS T/RH Probe

1. Compare T/RH measured with the calibration handheld T/RH probe with the BBSS unit in the Stevenson Screen.
2. If values differ by more than 6%, contact mentor.

V. References:

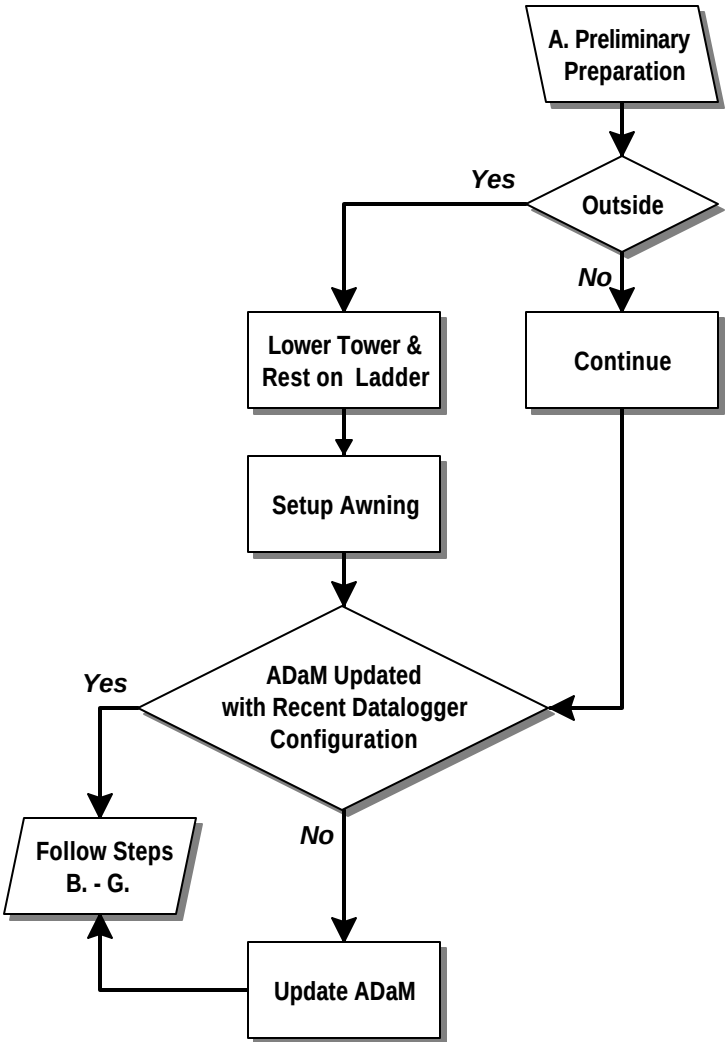
1. Coastal Environmental Systems, "Acceptance Procedures," 1995.
2. Zeno Corp., "Zeno-3200 Users Manual," May, 1995.

3. Hart, R. "SMET Datalogger (also T/RH Probe, and Wind Monitor) Installation and Replacement Procedures: Including and SMET Sensor Configuration Tables", ANL ARCS Procedures, 1995.

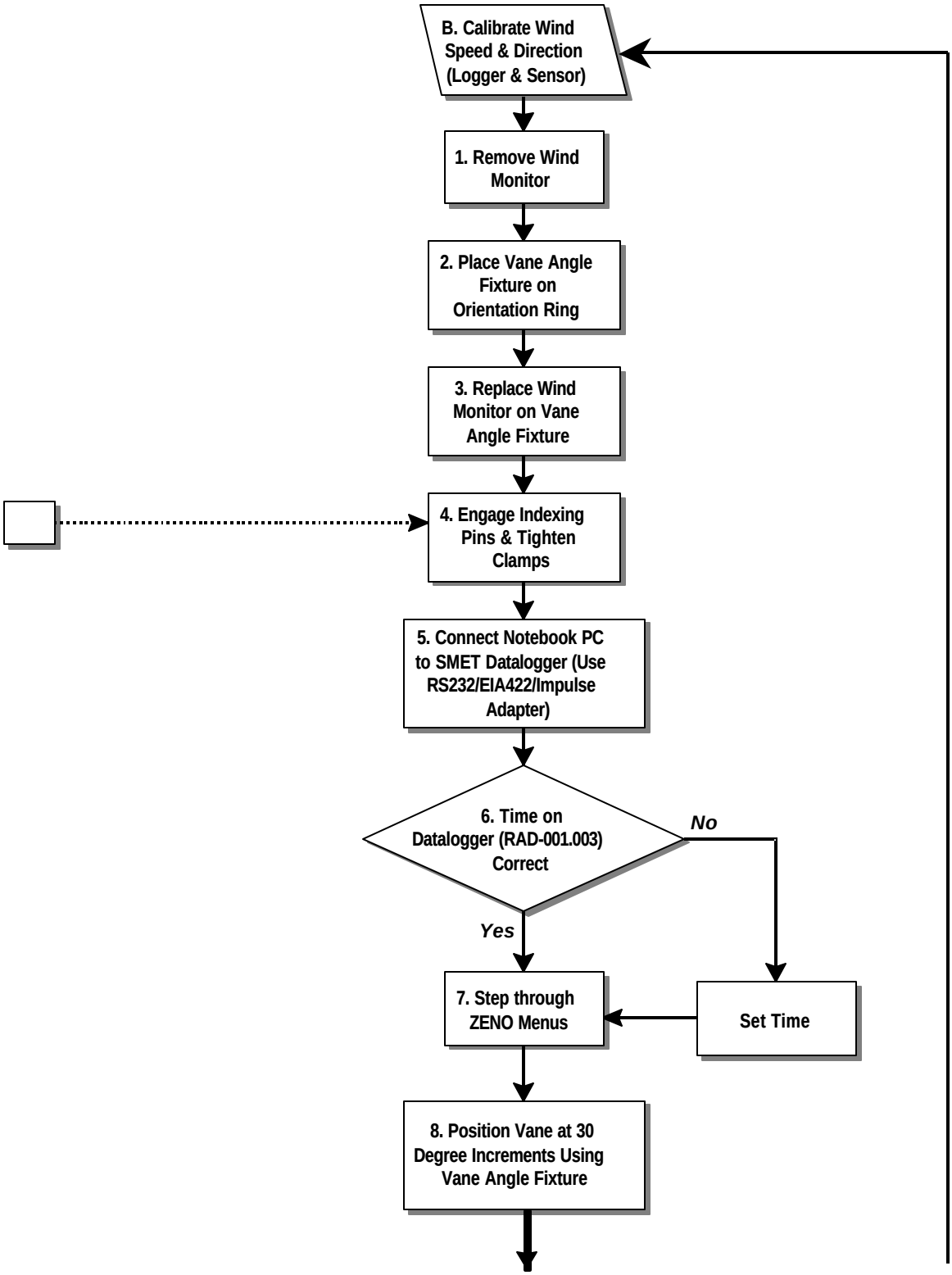
VI. Attachments:

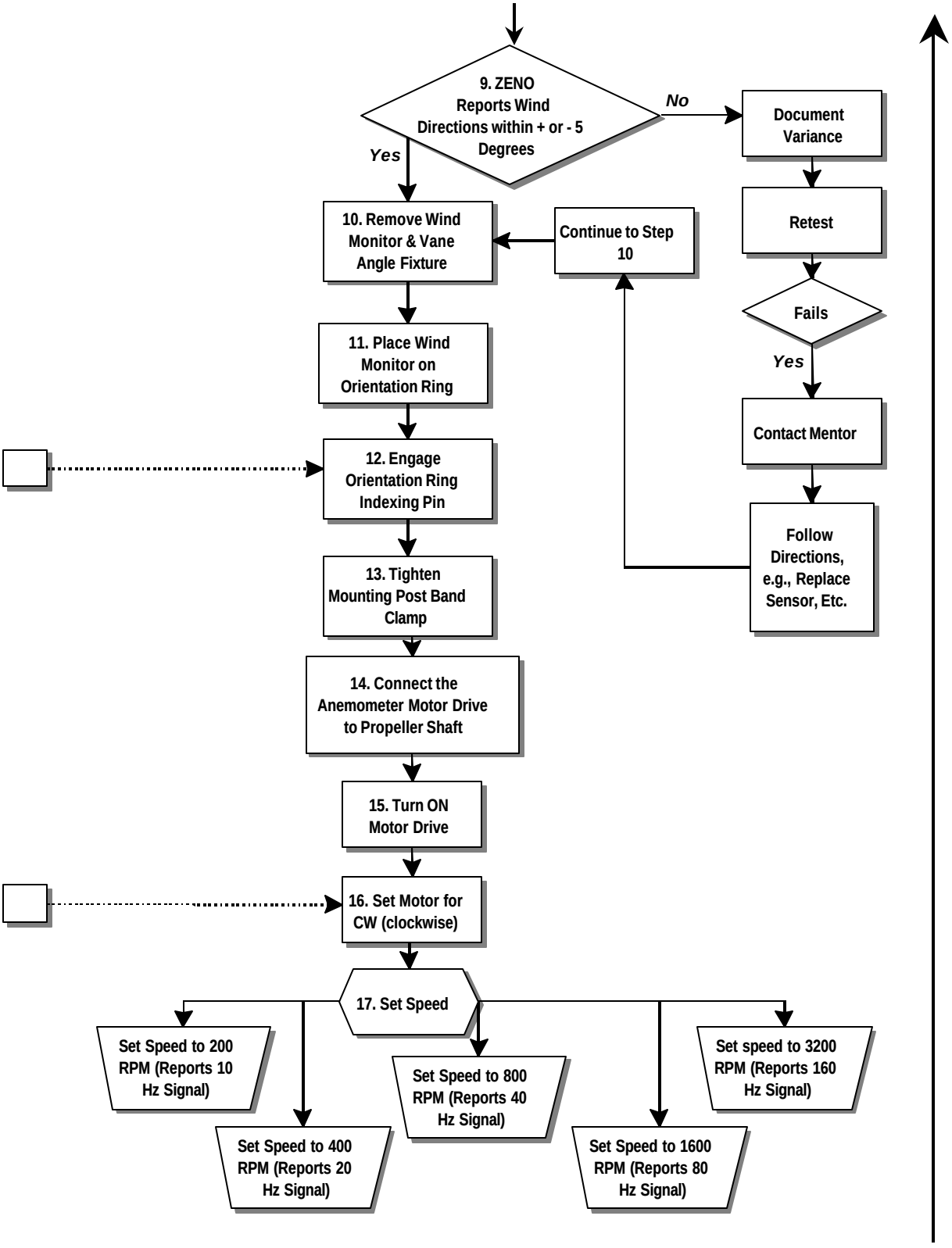
1. A. Preliminary Preparation Work Process Flow Diagram
2. B. ARCS SMET Datalogger and Sensor Calibration (CALF) Work Process Flow Diagram
3. C. Calibrate T/RH (Both Logger and Sensor) Work Process Flow Diagram
4. D. Installation of the Probe into the Aspirated Radiation Shield Work Process Flow Diagram
5. E. Using Voltage Reference to Calibrate the Optical Rain Gauge (both logger and Sensor) or the datalogger RH and Wind Direction Channels (if Necessary) Work Process Flow Diagram
6. F. Check Barometer (both Logger and Sensor) Work Process Flow Diagram
7. G. Calibrate RH Part of T/RH Probe Using Calibration Box and Salt Solutions Work Process Flow Diagram
8. SMET Sensor Configuration Table
9. SMET Logger Data Output Table
10. Example of SMET Logger Configuration
11. CALF(DAQM1)-0002, ARCS SMET Datalogger and Sensor Field Calibration Form
12. Example of Completed Form
13. Enter and Exit GNDRAD and SMET ZENO CONFIG Process

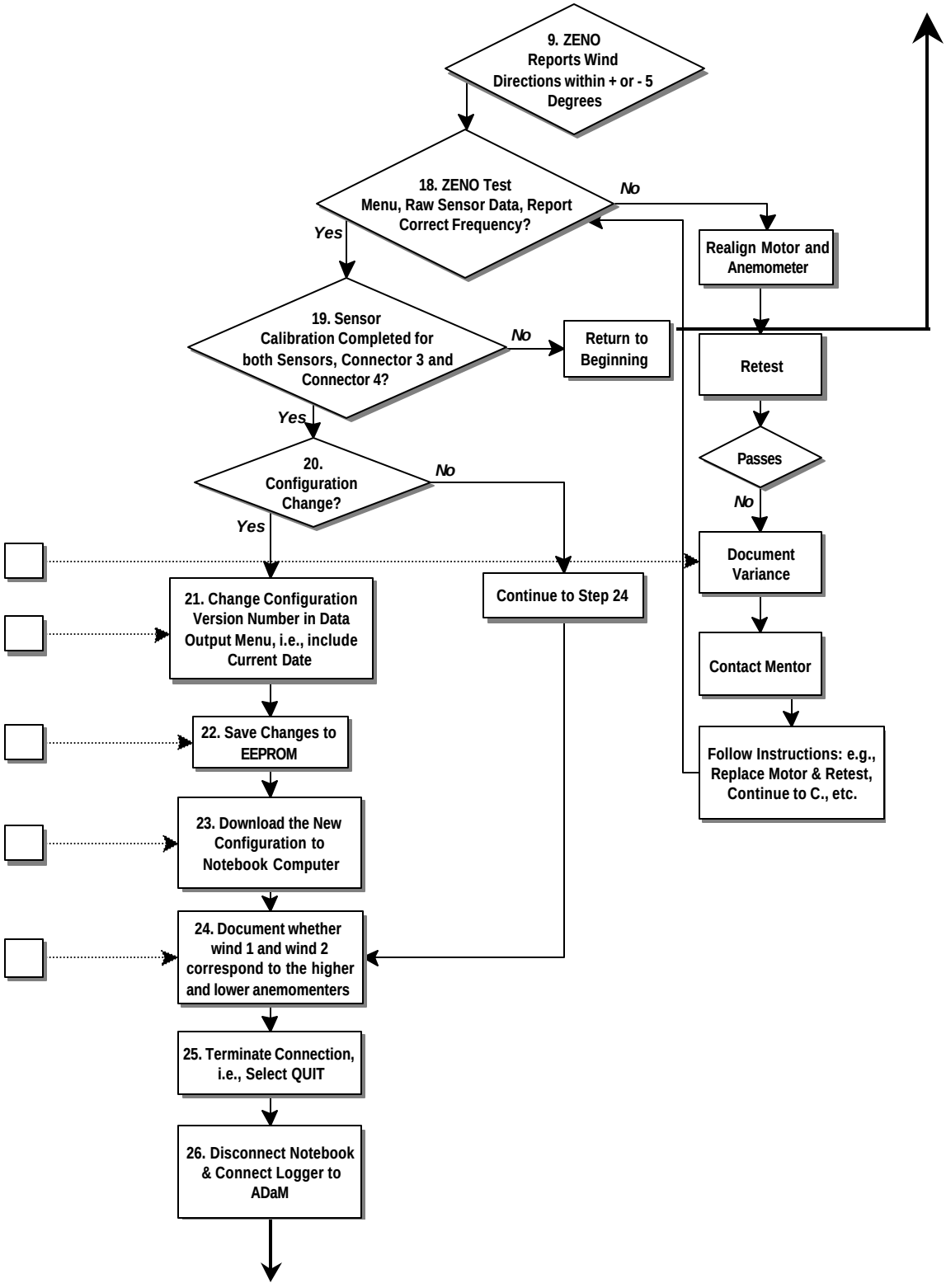
Attachment 1 - A. Preliminary Preparation Work Process Flow Diagram

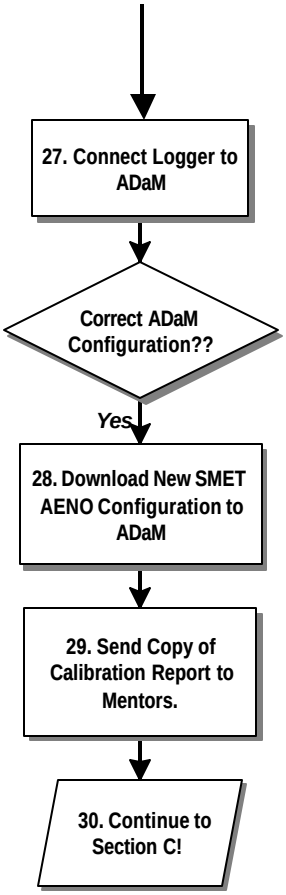


Attachment 2 - B. ARCS SMET Datalogger and Sensor Calibration (CALF) Work Process Flow Diagram

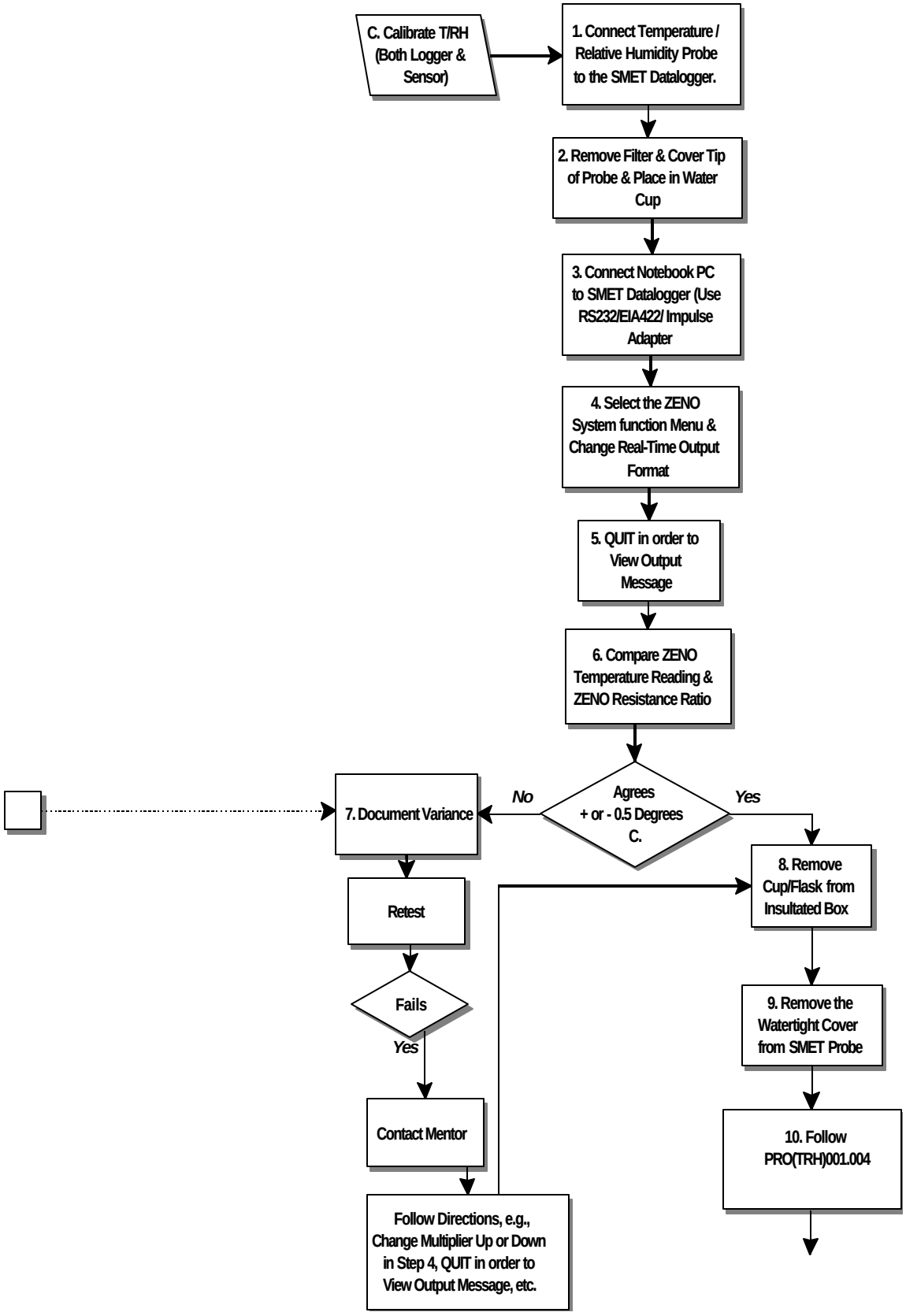


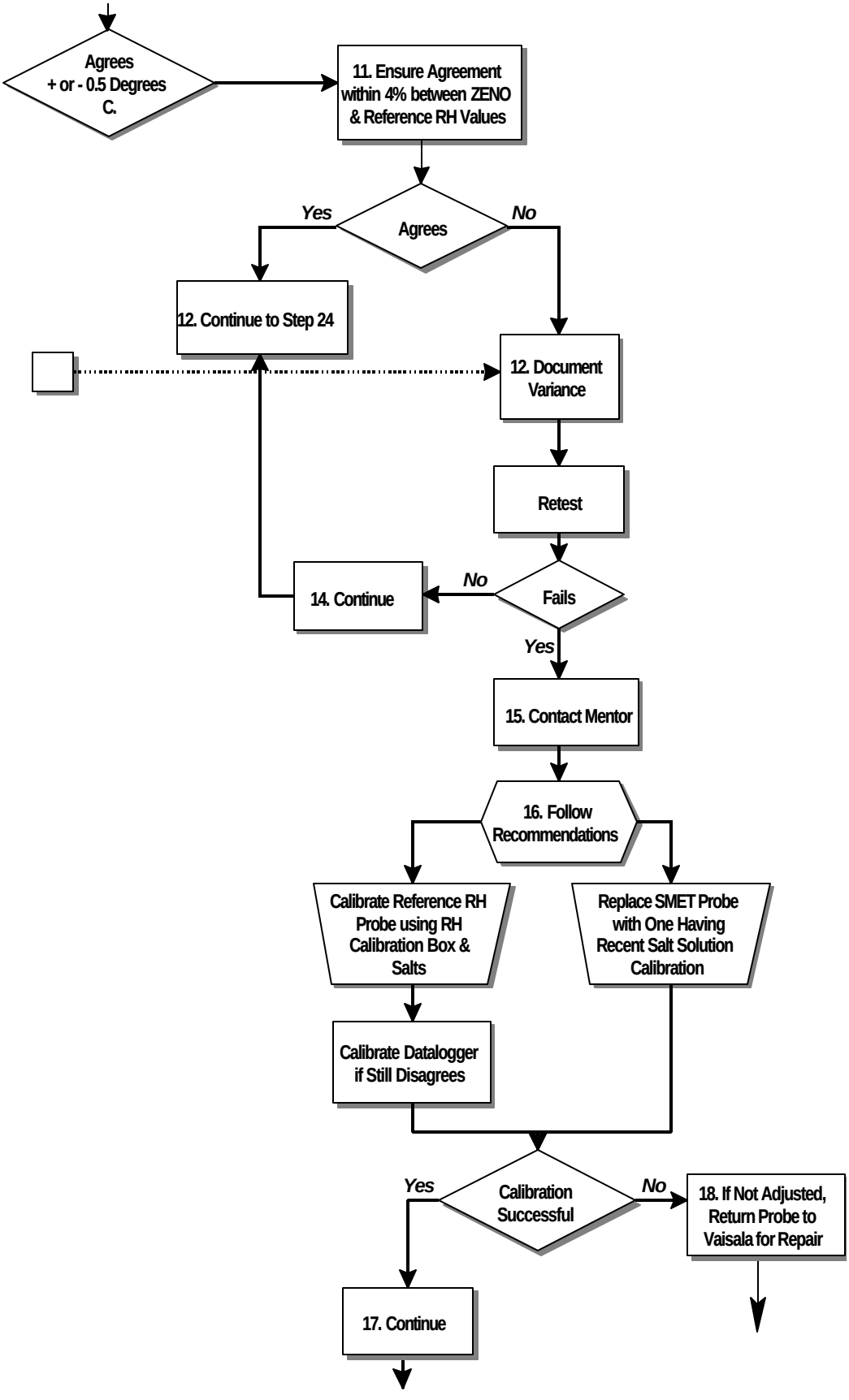

9. ZENO Reports Wind Directions within + or - 5 Degrees
No
Yes
Document Variance
Retest
Fails
Yes
Contact Mentor
Follow Directions, e.g., Replace Sensor, Etc.
Continue to Step 10
10. Remove Wind Monitor & Vane Angle Fixture
11. Place Wind Monitor on Orientation Ring
12. Engage Orientation Ring Indexing Pin
13. Tighten Mounting Post Band Clamp
14. Connect the Anemometer Motor Drive to Propeller Shaft
15. Turn ON Motor Drive
16. Set Motor for CW (clockwise)
17. Set Speed
Set Speed to 200 RPM (Reports 10 Hz Signal)
Set Speed to 400 RPM (Reports 20 Hz Signal)
Set Speed to 800 RPM (Reports 40 Hz Signal)
Set Speed to 1600 RPM (Reports 80 Hz Signal)
Set speed to 3200 RPM (Reports 160 Hz Signal)

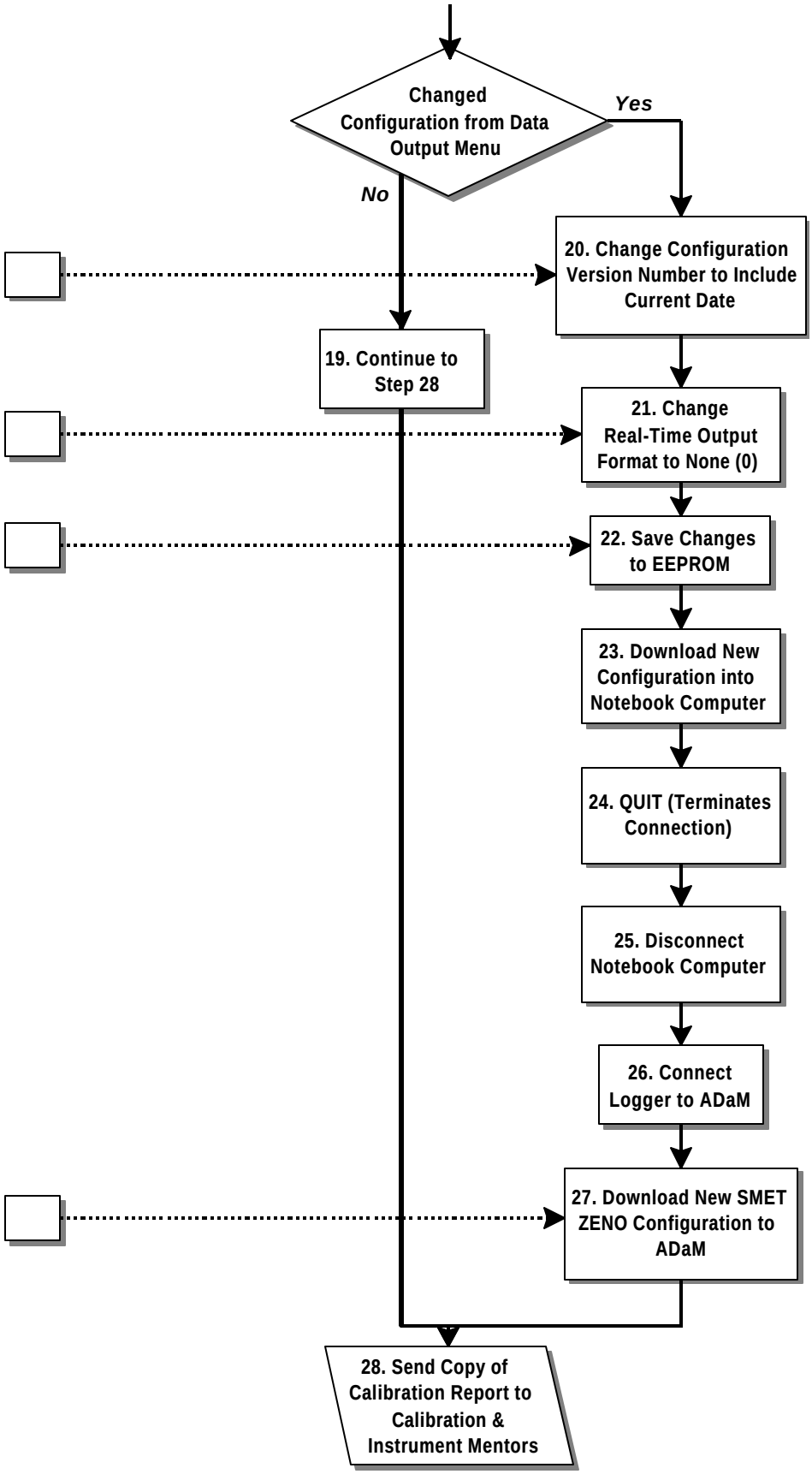

9. ZENO Reports Wind Directions within + or - 5 Degrees
18. ZENO Test Menu, Raw Sensor Data, Report Correct Frequency?
No
Yes
Realign Motor and Anemometer
19. Sensor Calibration Completed for both Sensors, Connector 3 and Connector 4?
No
Return to Beginning
Retest
Yes
Passes
20. Configuration Change?
No
Yes
No
Document Variance
Continue to Step 24
Contact Mentor
21. Change Configuration Version Number in Data Output Menu, i.e., include Current Date
Follow Instructions: e.g., Replace Motor & Retest, Continue to C., etc.
22. Save Changes to EEPROM
23. Download the New Configuration to Notebook Computer
24. Document whether wind 1 and wind 2 correspond to the higher and lower anemomenters
25. Terminate Connection, i.e., Select QUIT
26. Disconnect Notebook & Connect Logger to ADaM


27. Connect Logger to ADaM
Correct ADaM Configuration??
Yes
28. Download New SMET AENO Configuration to ADaM
29. Send Copy of Calibration Report to Mentors.
30. Continue to Section C!

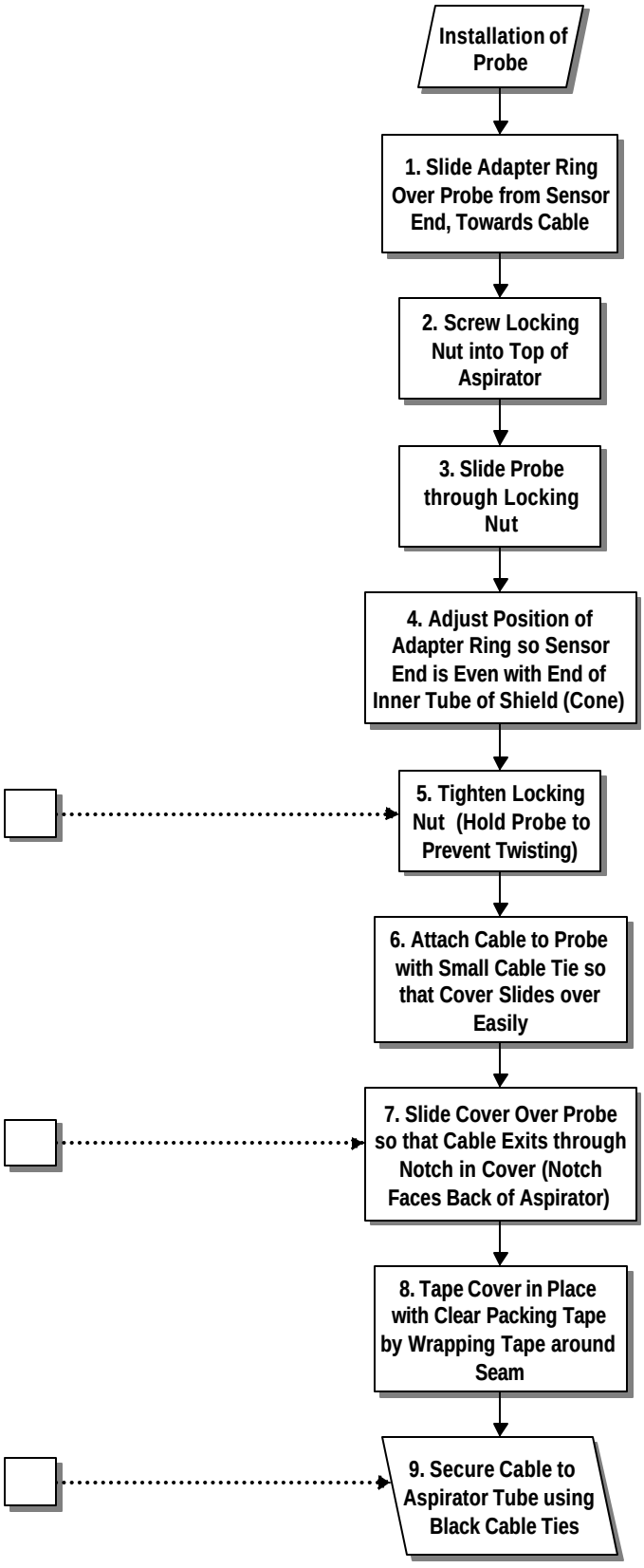
Attachment 3 – C. Calibrate T/RH (Both Logger and Sensor) Work Process Flow Diagram



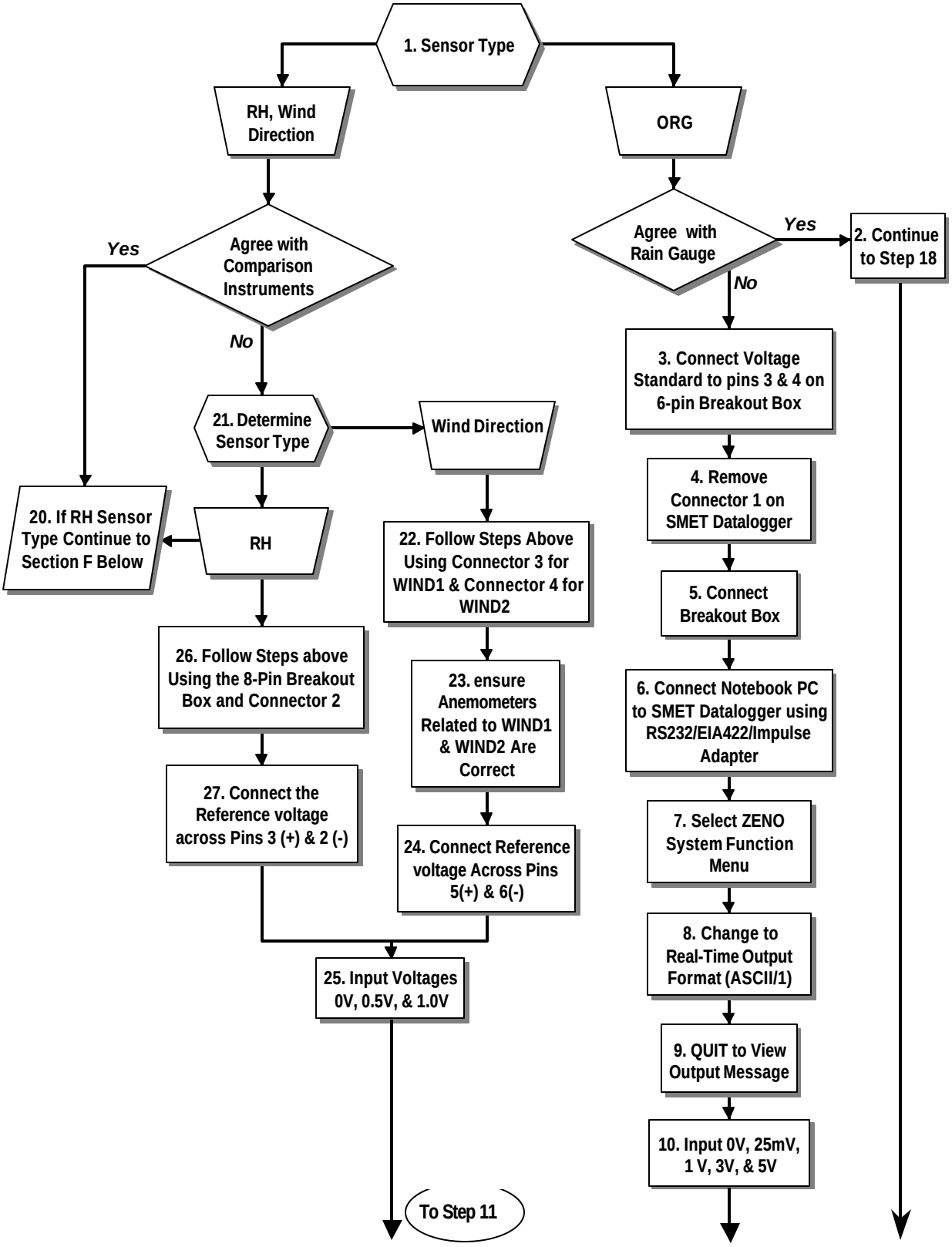

Agrees
+ or - 0.5 Degrees
C.
11. Ensure Agreement within 4% between ZENO & Reference RH Values
Agrees
Yes
No
12. Continue to Step 24
12. Document Variance
Retest
Fails
No
14. Continue
Yes
15. Contact Mentor
16. Follow Recommendations
Calibrate Reference RH Probe using RH Calibration Box & Salts
Replace SMET Probe with One Having Recent Salt Solution Calibration
Calibrate Datalogger if Still Disagrees
Calibration Successful
Yes
No
18. If Not Adjusted, Return Probe to Vaisala for Repair
17. Continue

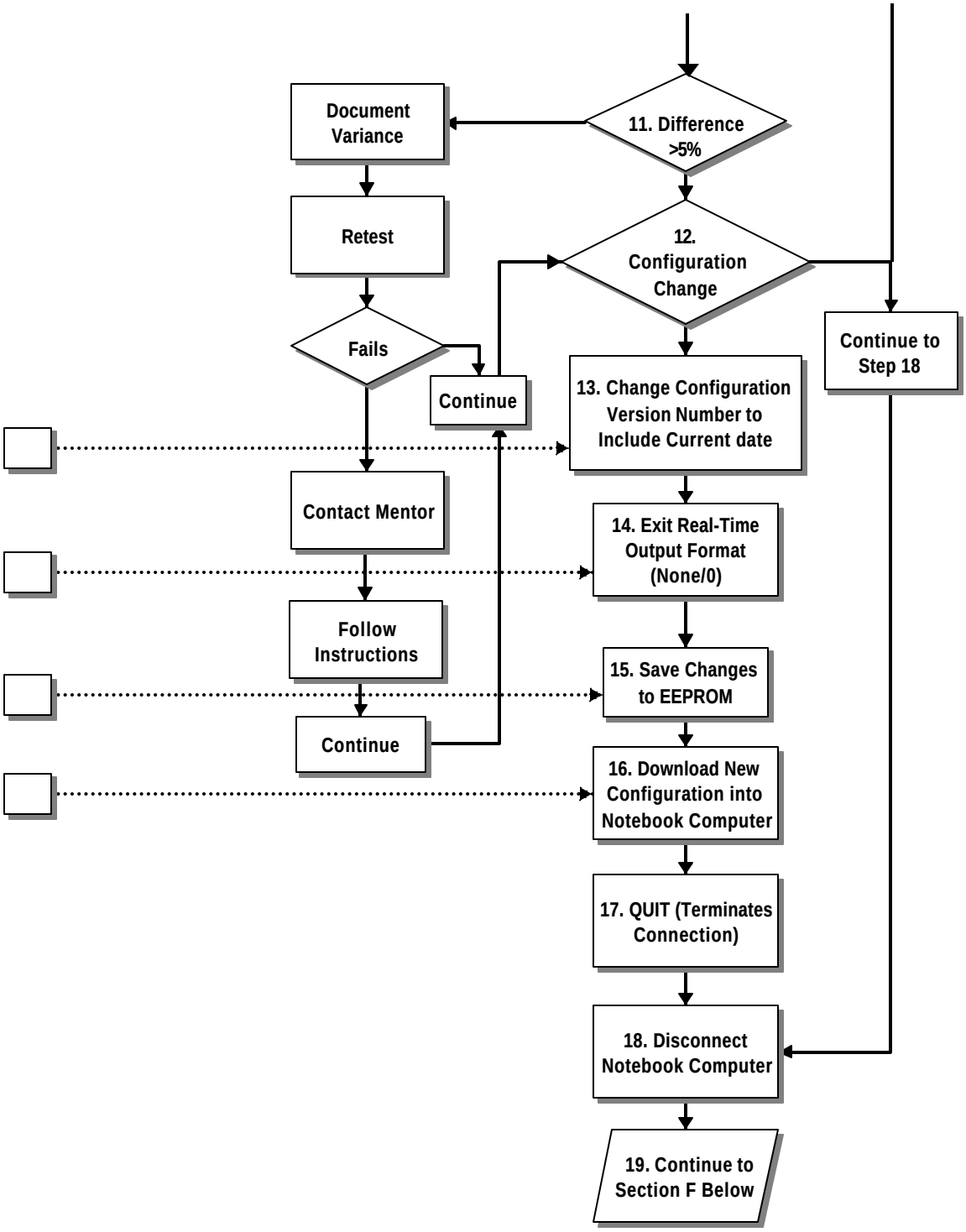

Changed Configuration from Data Output Menu
Yes
No
20. Change Configuration Version Number to Include Current Date
19. Continue to Step 28
21. Change Real-Time Output Format to None (0)
22. Save Changes to EEPROM
23. Download New Configuration into Notebook Computer
24. QUIT (Terminates Connection)
25. Disconnect Notebook Computer
26. Connect Logger to ADaM
27. Download New SMET ZENO Configuration to ADaM
28. Send Copy of Calibration Report to Calibration & Instrument Mentors

Attachment 4
D. Installation of the Probe into the Aspirated Radiation Shield Work Process Flow Diagram



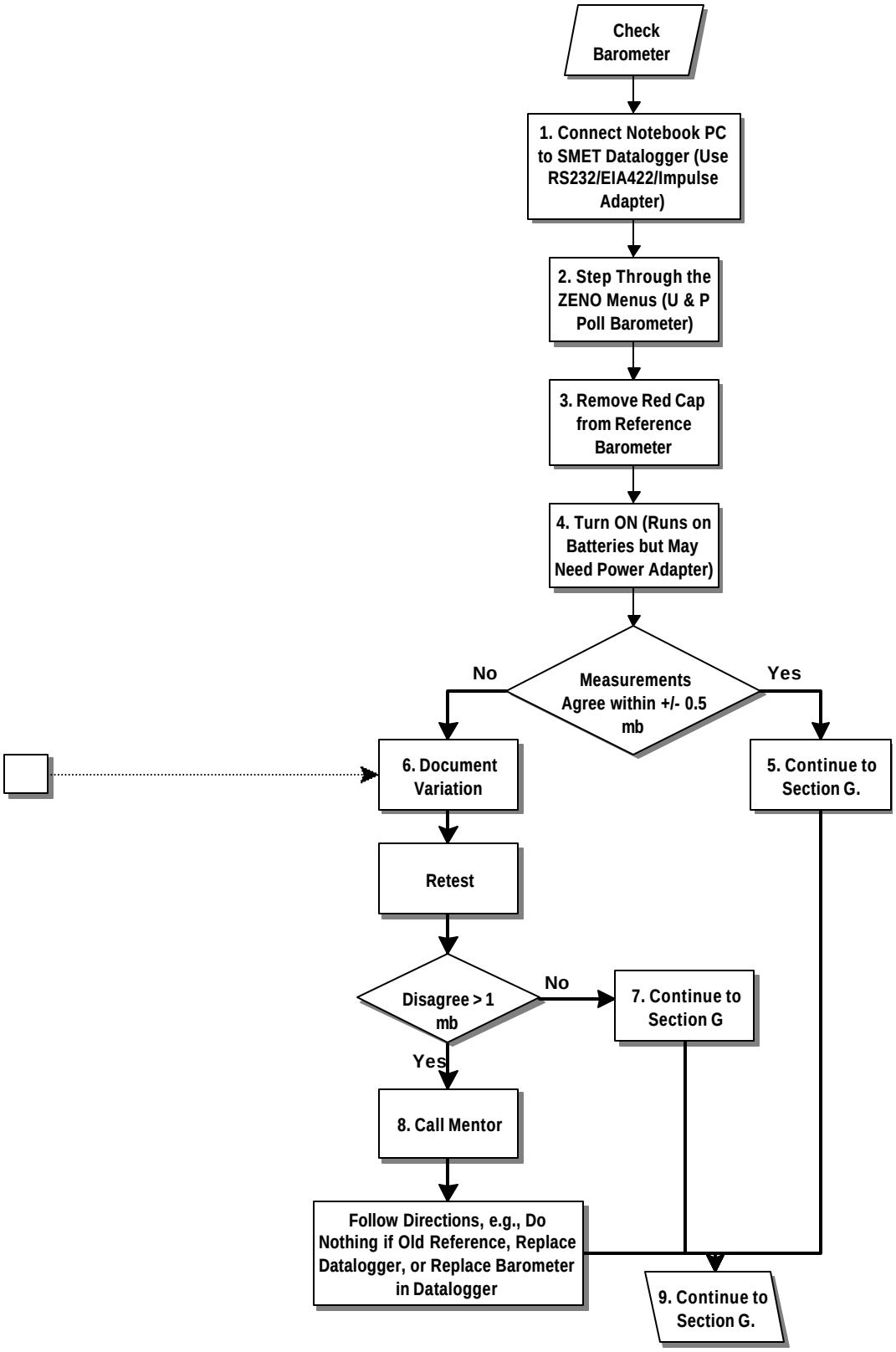
Attachment 5—E. Using Voltage Reference to Calibrate the Optical Rain Gauge (Both Logger & Sensor) or the Datalogger RH & Wind Direction Channels (If Necessary) Work Process Flow Diagram




11. Difference >5%
Document Variance
Retest
Fails
Continue
12. Configuration Change
Continue to Step 18
13. Change Configuration Version Number to Include Current date
Contact Mentor
14. Exit Real-Time Output Format (None/0)
Follow Instructions
15. Save Changes to EEPROM
Continue
16. Download New Configuration into Notebook Computer
17. QUIT (Terminates Connection)
18. Disconnect Notebook Computer
19. Continue to Section F Below

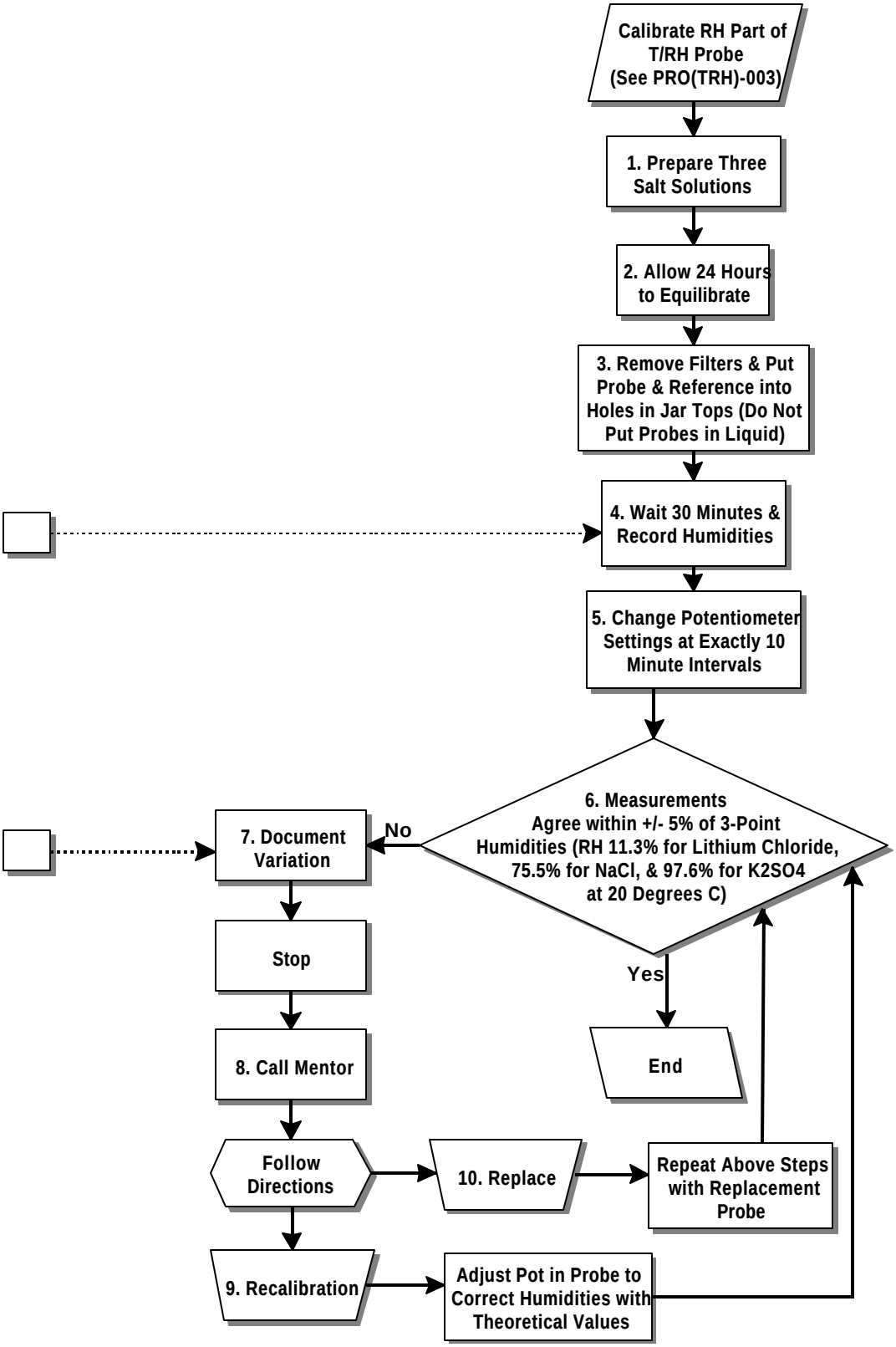
Attachment 6

F. Check Barometer (Both Logger & Sensor) Work Process Flow Diagram



Attachment 7

G. Calibrate RH Part of T/RH Probe Using Calibration Box & Salt Solutions Work Process Flow Diagram



Attachment 8 — SMET Sensor Configuration Table

When installing or changing the following sensors or instruments, the calibration coefficients need to be written into the appropriate ZENO Sensor Menu. The calibration coefficient for the air temperature sensor is in the ZENO Process Menu. Details on determining and changing this coefficient is discussed separately.

Sensor or Instrument	Designation	Sensor No.	Connector No.
Wind Speed 1	WSPD1	1	3
Wind Direction 1	WDIR1	2	3
Wind Speed 2	WSPD2	3	4
Wind Direction 2	WDIR2	4	4
Relative Humidity	RH	7	2
Optical Rain Gauge	R-RATE	8	1

PLATINUM RTD RESISTANCE/TEMPERATURE TABLE

100 Ω at 0°C 0.00385 Ω/Ω/°C

T (°C)	R (Ω)	T(°C)	R (Ω)	T (°C)	R (Ω)	T (°C)	R (Ω)
0.0	100.000	4.4	101.718	8.8	103.435	13.2	105.148
0.1	100.039	4.5	101.757	8.9	103.474	13.3	105.187
0.2	100.078	4.6	101.796	9.0	103.513	13.4	105.226
0.3	100.117	4.7	101.835	9.1	103.551	13.5	105.265
0.4	100.156	4.8	101.875	9.2	103.590	13.6	105.304
0.5	100.195	4.9	101.914	9.3	103.629	13.7	105.343
0.6	100.234	5.0	101.953	9.4	103.668	13.8	105.382
0.7	100.274	5.1	101.992	9.5	103.707	13.9	105.421
0.8	100.313	5.2	102.031	9.6	103.746	14.0	105.460
0.9	100.352	5.3	102.070	9.7	103.785	14.1	105.499
1.0	100.391	5.4	102.109	9.8	103.824	14.2	105.538
1.1	100.430	5.5	102.148	9.9	103.863	14.3	105.577
1.2	100.469	5.6	102.187	10.0	103.902	14.4	105.615
1.3	100.508	5.7	102.226	10.1	103.941	14.5	105.654
1.4	100.547	5.8	102.265	10.2	103.980	14.6	105.693
1.5	100.586	5.9	102.304	10.3	104.019	14.7	105.732
1.6	100.625	6.0	102.343	10.4	104.058	14.8	105.771
1.7	100.664	6.1	102.382	10.5	104.097	14.9	105.810
1.8	100.703	6.2	102.421	10.6	104.136	15.0	105.849
1.9	100.742	6.3	102.460	10.7	104.175	15.1	105.888
2.0	100.781	6.4	102.499	10.8	104.214	15.2	105.927
2.1	100.820	6.5	102.538	10.9	104.253	15.3	105.966

2.2	100.859	6.6	102.577	11.0	104.292	15.4	106.005
2.3	100.899	6.7	102.616	11.1	104.331	15.5	106.043
2.4	100.938	6.8	102.655	11.2	104.370	15.6	106.082
2.5	100.977	6.9	102.694	11.3	104.409	15.7	106.121
2.6	101.016	7.0	102.733	11.4	104.448	15.8	106.160
2.7	101.055	7.1	102.772	11.5	104.487	15.9	106.199
2.8	101.094	7.2	102.811	11.6	104.525	16.0	106.238
2.9	101.133	7.3	102.850	11.7	104.564	16.1	106.277
3.0	101.172	7.4	102.889	11.8	104.603	16.2	106.316
3.1	101.211	7.5	102.928	11.9	104.642	16.3	106.355
3.2	101.250	7.6	102.967	12.0	104.681	16.4	106.394
3.3	101.289	7.7	103.006	12.1	104.720	16.5	106.432
3.4	101.328	7.8	103.045	12.2	104.759	16.6	106.471
3.5	101.367	7.9	103.084	12.3	104.798	16.7	106.510
3.6	101.406	8.0	103.123	12.4	104.837	16.8	106.549
3.7	101.445	8.1	103.162	12.5	104.876	16.9	106.588
3.8	101.484	8.2	103.201	12.6	104.915	17.0	106.627
3.9	101.523	8.3	103.240	12.7	104.954	17.1	106.666
4.0	101.562	8.4	103.279	12.8	104.993	17.2	106.705
4.1	101.601	8.5	103.318	12.9	105.032	17.3	106.743
4.2	101.640	8.6	103.357	13.0	105.071	17.4	106.782
4.3	101.679	8.7	103.396	13.1	105.110	17.5	106.821

T (°C)	R (Ω)	T(°C)	R (Ω)	T (°C)	R (Ω)	T (°C)	R (Ω)
17.6	106.860	22.3	108.686	27.0	110.509	31.7	112.330
17.7	106.899	22.4	108.725	27.1	110.548	31.8	112.369
17.8	106.938	22.5	108.764	27.2	110.587	31.9	112.407
17.9	106.977	22.6	108.802	27.3	110.626	32.0	112.446
18.0	107.016	22.7	108.841	27.4	110.664	32.1	112.485
18.1	107.054	22.8	108.880	27.5	110.703	32.2	112.524
18.2	107.093	22.9	108.919	27.6	110.742	32.3	112.562
18.3	107.132	23.0	108.958	27.7	110.781	32.4	112.601
18.4	107.171	23.1	108.997	27.8	110.819	32.5	112.640
18.5	107.210	23.2	109.035	27.9	110.858	32.6	112.678
18.6	107.249	23.3	109.074	28.0	110.897	32.7	112.717
18.7	107.288	23.4	109.113	28.1	110.936	32.8	112.756
18.8	107.327	23.5	109.152	28.2	110.974	32.9	112.795
18.9	107.365	23.6	109.191	28.3	111.013	33.0	112.833
19.0	107.404	23.7	109.229	28.4	111.052	33.1	112.872
19.1	107.443	23.8	109.268	28.5	111.091	33.2	112.911
19.2	107.482	23.9	109.307	28.6	111.129	33.3	112.949
19.3	107.521	24.0	109.346	28.7	111.168	33.4	112.988
19.4	107.560	24.1	109.385	28.8	111.207	33.5	113.027
19.5	107.599	24.2	109.423	28.9	111.246	33.6	113.065
19.6	107.637	24.3	109.462	29.0	111.284	33.7	113.104
19.7	107.676	24.4	109.501	29.1	111.323	33.8	113.143
19.8	107.715	24.5	109.540	29.2	111.362	33.9	113.181
19.9	107.754	24.6	109.579	29.3	111.401	34.0	113.220
20.0	107.793	24.7	109.617	29.4	111.439	34.1	113.259
20.1	107.832	24.8	109.656	29.5	111.478	34.2	113.297

20.2	107.870	24.9	109.695	29.6	111.517	34.3	113.336
20.3	107.909	25.0	109.734	29.7	111.556	34.4	113.375
20.4	107.948	25.1	109.773	29.8	111.594	34.5	113.414
20.5	107.987	25.2	109.811	29.9	111.633	34.6	113.452
20.6	108.026	25.3	109.850	30.0	111.672	34.7	113.491
20.7	108.065	25.4	109.889	30.1	111.711	34.8	113.530
20.8	108.104	25.5	109.928	30.2	111.749	34.9	113.568
20.9	108.142	25.6	109.966	30.3	111.788	35.0	113.607
21.0	108.181	25.7	110.005	30.4	111.827	35.1	113.646
21.1	108.220	25.8	110.044	30.5	111.865	35.2	113.684
21.2	108.259	25.9	110.083	30.6	111.904	35.3	113.723
21.3	108.298	26.0	110.122	30.7	111.943	35.4	113.762
21.4	108.337	26.1	110.160	30.8	111.982	35.5	113.800
21.5	108.375	26.2	110.199	30.9	112.020	35.6	113.839
21.6	108.414	26.3	110.238	31.0	112.059	35.7	113.878
21.7	108.453	26.4	110.277	31.1	112.098	35.8	113.916
21.8	108.492	26.5	110.315	31.2	112.136	35.9	113.955
21.9	108.531	26.6	110.354	31.3	112.175	36.0	113.994
22.0	108.570	26.7	110.393	31.4	112.214	36.1	114.032
22.1	108.608	26.8	110.432	31.5	112.253	36.2	114.071
22.2	108.647	26.9	110.471	31.6	112.291	36.3	114.110

T (°C)	R (Ω)	T(°C)	R (Ω)	T (°C)	R (Ω)	T (°C)	R (Ω)
36.4	114.148	37.4	114.535	38.4	114.921	39.4	115.307
36.5	114.187	37.5	114.573	38.5	114.960	39.5	115.346
36.6	114.226	37.6	114.612	38.6	114.998	39.6	115.385
36.7	114.264	37.7	114.651	38.7	115.037	39.7	115.423
36.8	114.303	37.8	114.689	38.8	115.076	39.8	115.462
36.9	114.342	37.9	114.728	38.9	115.114	39.9	115.501
37.0	114.380	38.0	114.767	39.0	115.153	40.0	115.539
37.1	114.419	38.1	114.805	39.1	115.192		
37.2	114.457	38.2	114.844	39.2	115.230		
37.3	114.496	38.3	114.883	39.3	115.269		

Attachment 9
SMET Logger Data Output Table

Site ID	Version #	Date

Time	Bit#	Rain Rate	RR_sd	RR_sd	RR_max	RR_min	Tair	Tair_sd	Tair_max	Tair_min	RH

RH_sd	RH_max	RH_min	Vapor_ave	Vapor_sd	Wspd_ave	Wdir_ave	Wsps_ave	Wsp1_STh	Wsp1_Gu	Wspd1_SD

Wspd1-Max	Wspd1_min	Wspd2_Vave	Wspd2_Vave	Wdir2_Vave	Wsp2_ave	Wspd2_STh	Wspd2_Gu	Wspd2_SD	Wspd2_max

Wspd2_min	Barometer	Int_Temp	Batt_Int	Batt_ext

Attachment 10
Example of SMET Logger Configuration

```
* Zeno 3200 System Setup File
* Program Version And Date: ZENO-3200 using ZENOSOFT V1.85H-1403B2-1.1 Feb 22 1999 15:21:33 CS B300
* (C)opyright 1995-1999, Coastal Environmental Systems, Seattle, WA, USA.
* Setup File Date And Time: 00/07/05 03:44:22
PARAM1 60 0 60 2 114 110 102 0 9600 9600
PARAM2 9600 0 0 0 0 3 0 0 0 0
PARAM3 16777 1 60 18 600 20 0 0 2 2
PARAM4 2 2 0 0 1 3276800 0 -1 5 0
PARAM5 3 0 0 0 100 0 0 0 0 0
PARAM6 0 0 0 916923600 50336144 151 196608 0 1 0
PARAM7 151 0 1280 0 10000 -1 -1 0 10 1
PARAM8 42 0 0 0 0 0 0 0 0 0
PARAM9 0 0 0 0
PARAM10 "NONE" "NONE" "NONE" "NONE" "NONE" "NONE" "" "ZENO" "" ""
REPEAT1 -1 -1 -1 -1 -1 -1 -1 -1
CONSTANT1 0 0 0 0 0 0 0 0 0 0
CONSTANT2 0 0 0 0 0 0 0 0 0 0
GSI 1 FLOAT 1
GSI 1 SEND "SEND\r"
GSI 1 RECEIVE 2000, "%7.1f\r\n", F1
SENSOR 7 "WSP1" 14 0 0 0 0 0 0 3 0 1 0 0.09642 0.38 0 0 0 0 0 0 0 0 0 0
SENSOR 1 "WDIR1" 0 0 0 0 2 4 0 1 0 2 0 142 0 0 0 0 0 0 0 0 0 0
SENSOR 7 "WSP2" 13 0 0 0 0 0 0 3 0 1 0 0.09635 0.3 0 0 0 0 0 0 0 0 0 0
SENSOR 1 "WDIR2" 1 0 0 0 2 5 0 1 0 2 0 142 0 0 0 0 0 0 0 0 0 0
SENSOR 3 "AIR_T" 3 1 1 0 1 0 0 2 0 2 0 1 0 0 0 0 0 0 0 0 0 0
SENSOR 3 "AIR_Ref" 2 0 2 0 1 0 0 2 0 2 0 1 0 0 0 0 0 0 0 0 0 0
SENSOR 2 "RH" 5 0 1 0 0 0 0 1 0 2 0 100 0 0 0 0 0 0 0 0 0 0
SENSOR 3 "R-RATE" 1 0 3 0 0 0 0 6 0 2 20 0 -0.149 0 0 0 0 0 0 0 0 0
SENSOR 16 "BARO" 0 0 0 5 0 0 5 1 0 3 0 1 0 3 0 0 9600 7 2 1 1 1
SENSOR 2 "BATT_EXT" 7 0 2 0 0 0 0 2 1 4 0 10.089 0 0 0 0 0 0 0 0 0 0
SENSOR 1 "BATT_INT" 2 0 0 0 0 0 0 2 1 4 0 1.0033 0 0 0 0 0 0 0 0 0 0
SENSOR 1 "Int_Temp" 3 0 0 0 0 0 0 1 0 4 0 1 0 0 0 0 0 0 0 0 0 0
PROCESS 1 2 "R-Rate" S8.1
PROCESS 3 2 "R-RtALRM" S8.1 500 0 12
PROCESS 5 7 "AT/ARef" S5.1 S6.1
PROCESS 5 5 "AT*13" P3.1 13
PROCESS 5 12 "AT_6POLa" P4.1 0 0 0 0 10.04 235.79 -245.83
PROCESS 5 12 "AT_6POLb" P5.1 6.13682e-13 2.03408e-10 3.03124e-08 2.65064e-06 0.000142894 0.00443652 0.061078
PROCESS 5 6 "AT6Pb*RH" P6.1 S7.1
PROCESS 1 2 "AT6PaAVE" P5.1
PROCESS 1 2 "RH_AVE" S7.1
PROCESS 1 2 "AT*RHAVE" P7.1
PROCESS 3 2 "AT6PaALM" P5.1 50 0 13
PROCESS 3 2 "RH_ALM" S7.1 104 0 14
PROCESS 1 2 "WSP1_AVE" S1.1
PROCESS 2 1 "WSP1VAVE" S1.1 S2.1 S0.1 4
PROCESS 3 2 "WSP1_ALM" S1.1 100 0 15
PROCESS 3 2 "WDIR1ALM" S2.1 360 0 16
PROCESS 1 2 "WSP2_AVE" S3.1
PROCESS 2 1 "WSP2VAVE" S3.1 S4.1 S0.1 4
PROCESS 3 2 "WSP2_ALM" S3.1 100 0 17
PROCESS 3 2 "WDIR2ALM" S4.1 360 0 18
PROCESS 1 1 "Baro" S9.1
PROCESS 3 2 "Baro_ALM" S9.1 1030 850 19
PROCESS 3 1 "BIT"
PROCESS 1 1 "Int_Temp" S12.1
PROCESS 1 1 "Batt_Ext" S10.1
PROCESS 1 1 "Batt_Int" S11.1
DATA 6 1,2 "TWP-" P1.1 0 0 1
DATA 6 1,2 "Nauru." P1.1 0 0 1
```

DATA 6 1,2 "smet<20>" P1.1 0 0 1
DATA 6 1 "V991018.00" P1.1 0 0 1
DATA 6 1 "<20>" P1.1 0 0 1
DATA 3 1 "" P1.1 0 0 1
DATA 8 1 "BIT" P23.L1 0 0 6
DATA 8 1 "RRATE_Ave" P1.1 2 0 8
DATA 8 1 "RRATE_SD" P1.3 2 0 8
DATA 8 1 "RRATE_Max" P1.4 2 0 8
DATA 8 1 "RRATE_Min" P1.5 2 0 8
DATA 8 1 "AIRT_Ave" P8.1 2 0 8
DATA 8 1 "AIRT_SD" P8.3 2 0 8
DATA 8 1 "AIRT_Max" P8.4 2 0 8
DATA 8 1 "AIRT_Min" P8.5 2 0 8
DATA 8 1 "RH_Ave" P9.1 1 0 8
DATA 8 1 "RH_SD" P9.3 1 0 8
DATA 8 1 "RH_Max" P9.4 1 0 8
DATA 8 1 "RH_Min" P9.5 1 0 8
DATA 8 1 "VP_Ave" P10.1 2 0 8
DATA 8 1 "VP_SD" P10.3 2 0 8
DATA 8 1 "WSP1_VAve" P14.1 2 0 8
DATA 8 1 "WDir1_VAve" P14.2 2 0 8
DATA 8 1 "WSP1_Ave" P13.1 2 0 8
DATA 8 1 "WSP1_STh" P14.6 2 0 8
DATA 8 1 "WSP1_Gu" P14.7 2 0 8
DATA 8 1 "WSP1_SD" P13.3 2 0 8
DATA 8 1 "WSP1_Max" P13.4 2 0 8
DATA 8 1 "WSP1_Min" P13.5 2 0 8
DATA 8 1 "WSP2_VAve" P18.1 2 0 8
DATA 8 1 "WDir2_VAve" P18.2 2 0 8
DATA 8 1 "WSP2_Ave" P17.1 2 0 8
DATA 8 1 "WSP2_STh" P18.6 2 0 8
DATA 8 1 "WSP2_Gu" P18.7 2 0 8
DATA 8 1 "WSP2_SD" P17.3 2 0 8
DATA 8 1 "WSP2_Max" P17.4 2 0 8
DATA 8 1 "WSP2_Min" P17.5 2 0 8
DATA 8 1 "BARO" P21.1 2 0 8
DATA 8 1 "INT_TEMP" P24.1 2 0 8
DATA 8 1 "Batt_Int" P26.1 2 0 8
DATA 8 1 "Batt_Ext" P25.1 2 0 8
DATA 6 2 "T_Rt/Ro:" P1.1 0 0 1
DATA 7 2 "Rt/R0" P4.1 4 0 1
DATA 6 2 "Air_T:" P1.1 0 0 1
DATA 7 2 "AIR_T" P5.1 2 0 1
DATA 6 1,2 "<0D><0A>" P1.1 0 0 1

Attachment 11
ARCS SMET Datalogger and Sensor Field Calibration Form FM(DAQM)-001

ARCS SMET Datalogger and Sensor Field Calibration Form

I. Calibration information

	Calibration	Calibration Check	Field Calibration
This is a (check which):			X

Date:	GMT Begin Time:	GMT End Date:	GMT End Time:	ARCS #

Instrument / System:	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
SMET Data Logger	ZENO-3200(SMET)	

Current Configuration Version:	New Configuration Version

Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):

Reference Instrument(s):	TWP OMS Part Number(s):	TWP OMS Serial Number(s)
Fluke 8842A Voltmeter	8842A	
Anemometer Drive	18801	
Vane Angle Bracket	18212	
T/RH Indicator / Probe	HMI41 / HMP41/45	
Digital Barometer	PA11A	
Rain Calibraqtor	TST-700A	
Reference Thermometer	YSI4600	
Spare T/RH Probe		
Chilled Mirror	BA2/TP3	

Verify that reference instruments' serial numbers above are correct or modified(check box if true) ☐

Verify that SMET instruments' serial numbers below are correct or modified(check box if true) ☐

Document(s) Referenced:	Document(s) Updated:
PRO(DAQM)-005.001	

II. Initial Values

Sensor / Element: Serial Number:	Reference: Target Actual	Reading: Actual or Range	Reference: Target Actual	Reading: Actual or Range	Reference: Target Actual	Reading: Actual or Range
SMET/WindHi	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionHi	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/WindLo	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionLo	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/Barometer			bbss			
SMET/Temperature	YSI 95H	Vaisala HMH95	YSI 95H	Tower Probe	YSI 95H	Vaisala HMI 31
SMET/RH	HMH 95	Probe	HMH 95	Probe	Chilled-Mirror	Probe
SMET/ORG	before	unscaled	before	Scaled		

Were there calibration changes? (yes / no)

NOTES:

III. Calilbration Change(if applicable)

Sensor or Parameter	Sensor Serial No.	Internal Resistance (Ohms)	Original Sensitivity (Volts/Unit)	Offset	Quadratic
	Old	Old	Old	Old	Old
	New	New	New	New	New

IV Final Values

.

Sensor / Element:	Reference: Target	Reading: Actual or	Reference: Target	Reading: Actual or	Reference: Target	Reading: Actual or
Serial Number:	Actual	Range	Actual	Range	Actual	Range
SMET/WindHi	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionHi	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/WindLo	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionLo	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/Barometer			bbss			
SMET/Temperature	YSI 95H	Vaisala HMH95	YSI 95H	Tower Probe	YSI 95H	Vaisala HMI 31
SMET/RH	HMH 95	Probe	HMH 95	Probe	Chilled-Mirror	Probe
SMET/ORG	before	unscaled	before	Scaled		

V **Statistics**(if applicable)

No. of Samples:	Std. Dev.	CF Range %	Uncertainty %

PROBLEMS:

Attachment 12
Example of Completed Form

ARCS SMET Datalogger and Sensor Field Calibration Form

I. Calibration information

This is a (check which):	Calibration	Calibration Check	Field Calibration
			X

Date:	GMT Begin Time:	GMT End Date:	GMT End Time:	ARCS #
6/30/00	3:12	7/1/00	3:20	2

Instrument / System:	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
SMET Data Logger	ZENO-3200(SMET)	300

Current Configuration Version:	New Configuration Version
V991018.00	

Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):
Nauru	Korke/Porch		

Reference Instrument(s):	TWP OMS Part Number(s):	TWP OMS Serial Number(s)
Fluke 8842A Voltmeter	8842A	
Anemometer Drive	18801	CA01719
Vane Angle Bracket	18212	#2
T/RH Indicator / Probe	HMI41 / HMP41/45	T1210149
Digital Barometer	PA11A	T1450041
Rain Calibraqtor	TST-700A	43
Reference Thermometer	YSI4600	98B101084/95SH1000180
Spare T/RH Probe		T151001
Chilled Mirror	BA2/TP3	042(box2)

Verify that reference instruments' serial numbers above are correct or modified(check box if true)	yes
Verify that SMET instruments' serial numbers below are correct or modified(check box if true)	yes

Document(s) Referenced:	Document(s) Updated:
PRO(DAQM)-005.001	

II. Initial Values

Sensor / Element: Serial Number:	Reference: Target Actual	Reading: Actual or Range	Reference: Target Actual	Reading: Actual or Range	Reference: Target Actual	Reading: Actual or Range
SMET/WindHi	10Hz / 1m/s		40Hz / 4m/s		80Hz / 8m/s	
31103/5318	200 rpm	0.7	800 rpm	4.2	1600 rpm	8.1
SMET/DirectionHi	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
31103/5318	3.5	46.4	88.6	181.4	269.3	0.0
SMET/WindLo	10Hz / 1m/s		40Hz / 4m/s		80Hz / 8m/s	
28399/55531	200 rpm	.86 to 1.04	800 rpm	4.15	1600 rpm	8.0
SMET/DirectionLo	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
28399/55531	0.5	45.1	88.0	179.7	271.5	353.6
SMET/Barometer			bbss			
unknown	1005.6	1005.2	1005.1			
SMET/Temperature	YSI 95H	Vaisala HMH95	YSI 95H	Tower Probe	YSI 95H	Vaisala HMI 31
S3740006	32.50	31.80	32.50	32.75	32.49	
SMET/RH	HMH 95	Probe	HMH 95	Probe	Chilled-Mirror	Probe
S3740006			56 to 61.4	61.7		
SMET/ORG	before	unscaled	before	Scaled		
03317-C7	3.005	2.88	178 to 181.5	170 drifts dn to 166		

Were there calibration changes? (yes / no) **no**

NOTES:
The wind calibrations began 6/30 at 03:12 and ended 05:00, the ORG calibration began 05:30 on 6/30 and ended 06:30, and the water bath temperature comparison began 7/1/00 at 2:45 and ended 03:20.

III. Calilbration Change(if applicable)

Sensor or Parameter	Sensor Serial No.	Internal Resistance (Ohms)	Original Sensitivity (Volts/Unit)	Offset	Quadratic
	Old	Old	Old	Old	Old
	New	New	New	New	New

IV Final Values

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Sensor / Element:	Reference: Target	Reading: Actual or	Reference: Target	Reading: Actual or	Reference: Target	Reading: Actual or
Serial Number:	Actual	Range	Actual	Range	Actual	Range
SMET/WindHi	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionHi	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/WindLo	10Hz / 1ms^{-1}		40Hz / 4ms^{-1}		80Hz / 16ms^{-1}	
	250 rpm		800 rpm		1600 rpm	
SMET/DirectionLo	0 deg.	45 deg.	90 deg.	180 deg.	270 deg.	355 deg.
SMET/Barometer			bbss			
SMET/Temperature	YSI 95H	Vaisala HMH95	YSI 95H	Tower Probe	YSI 95H	Vaisala HMI 31
SMET/RH	HMH 95	Probe	HMH 95	Probe	Chilled-Mirror	Probe
SMET/ORG	before	unscaled	before	Scaled		

V Statistics(if applicable)

No. of Samples:	Std. Dev.	CF Range %	Uncertainty %

PROBLEMS:
My computer kept getting PORT 1 Unavailable error. Set up Ttale with Dennis' computer but when we went to download the next day Cnrl C did nothing and aparently the chilled mirror data from Box 1 was lost. Then I tried the observer computer and we were able to initialize and download chilled-mirror data from Box 2.

Attachment 13– Enter and Exit GNDRAD and SMET ZENO CONFIG Process
(Temporary Addenda to DAQ Calibration Procedures until Coastal Fixes Software Problem)

1. Connect to SKYRAD using telnet, terminal, hyperterminal, . . .
2. Enter **u<cr>** to bring up Zeno User Menu.
3. Enter **z<cr>** and the password **zeno<cr>** to go into Zeno Program Menu.

(Within Zeno Program make changes that are needed [example below].)

4. Enter **p<cr>** to go to the Process Menu.
5. Enter **j7<cr>** to go to process step 7.
6. Enter **c10/9972<cr>** to change the erroneous coefficient.

(End of example.)

7. Enter **z<cr>** to return to the Zeno Program Menu.
8. Enter **d<cr>** to enter the Data Output Menu.
9. Enter **j4<cr>** to go to data output line 4.
10. Enter **c3/Vyymmdd.00<cr>** where **yy** is the year (00), **mm** is the month, and **dd** is the day of the month.
11. Enter **z<cr>** to return to the Zeno Program Menu.
12. Enter **e<cr>** to save the change to **eeprom**.

Perform the following between steps 12 and 13 if the change is done locally instead of remotely:

12.a. Enter **l<cr>** to go to the System Load Menu.
12.b. Enter **xt<cr>** to transmit the config file to the local pc.
12.c. After the config file is received, enter **z<cr>** to return to the Zeno Program Menu.

13. Enter **r<cr>** and then **y<cr>** to reset the system.
14. Wait for the following response from the Zeno:

The system will now reset. Please wait.
Searching for flash logging memory . . .
Found Chip #1.
Found Chip #2.
Found Chip #3.
Found Chip #4.
Found Chip #5.
Found Chip #6.
Found Chip #7.
Found Chip #8.
Watchdog Reset
Please wait . . ./
ZENO-3200 using ZENOSOFT V1.85H-1403B2-1.1 Feb 22 1999 15:21:33 CS B300 ©opyright 1995-1999, Coastal Environment Systems, Seattle, WA, USA.
System Tim = 00/01/05 18:56:16
Initializaing Zeno 3200 . . ./

Zeno 3200 is Data Sampling. Type 'U'<enter> to access the User Interface.
Note! The System Time will be the current Zeno date and time.

15. Disconnect from the Zeno.